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DUPLICITY OF 31 *β LEONIS MINORIS.*

The Durchmusterung magnitude of this star is 4.0. I have recently found it to be a close double. The companion is from two to three magnitudes fainter than the principal star, and situated in the direction 232° at a distance of not quite half a second.

From the character of this pair, I should at once say that it is probably a binary; that the two stars are physically connected is almost certain from the amount and direction of the proper motion. *β Leonis Minoris* is given in the fundamental star catalogues with a well-determined proper motion, amounting to $0''.164$ per year in the direction 225° . Were the two components not moving together, this would have been a very easy pair a few years ago, and its duplicity could hardly have escaped detection even by the meridian observers.

The position of the star for the epoch 1900 is

R.A. $10^{\text{h}} 22^{\text{m}} 6^{\text{s}}$; Decl. $+37^\circ 13' 2$.

W. J. HUSSEY.

ON THE SPECTRA OF *R Scuti* AND *W Cygni**.

Observations of the spectra of *R Scuti* and *W Cygni* are particularly valuable, as these stars occupy a unique position between the short-period variables on the one hand and the *o Ceti* variables on the other. Visual observations of *R Scuti* by ESPIN have led him to suspect the presence of bright lines in its spectrum, but he seems to have been unable to identify them. As far as I know, *W Cygni* had not been observed with the spectroscope.

Exposures upon both these stars with Spectrograph I were begun in the middle of July, 1903. They were continued until November 11, 1903, in case of *R Scuti*, and December 28, 1903, in case of *W Cygni*. *R Scuti* was examined visually with the spectrograph until December 7th. In the mean time, *R Scuti* rose to maxima toward the end of July and the beginning of October, while maxima of *W Cygni* occurred early in August and in the middle of December. During this period about twenty-five spectrograms of *R Scuti* and twenty of *W Cygni* were secured with Spectrograph I.

* From *Lick Observatory Bulletin*, No. 62.

On plate 13E of *R Scuti*, H β , H γ , and H δ shone out strongly as bright lines, but they faded quickly until at minimum the spectrum of the star departed but little from the solar type, with dark hydrogen lines of customary intensity. At the two subsequent maxima the bright hydrogen lines were not seen, but the intensity of the absorption line at H γ seemed to have decreased very much as the star approached its maximum of October. Judging from rough measures of a few plates, the radial velocity of this star appears to be constant and about +42^{km} in actual value.

W Cygni shows a banded spectrum of a type characteristic of long-period variables. At the maximum of August, 1903, the hydrogen lines mentioned above appeared as strong bright lines which faded gradually to the star's minimum, while the absorption line at g broadened greatly during the same period. Other suspected bright lines in the spectrum of this star remain to be identified.

A detailed study of these plates will be made at the earliest opportunity.

RALPH H. CURTISS.

July, 1904.
